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THE COLDWARD COURSE OF PROGRESS

THE leadership in world civilization is inseparably linked with climate. With advance in culture it has been transferred toward colder lands, and when extant culture has declined, leadership usually has retreated southward.

Civilization began in Egypt and Sumeria, hot countries. Then the leadership was assumed by Babylonia, Crete, Phoenicia, Assyria *etc.*, tending always toward the north. In the diagram of the path of supremacy (page 395) the temperatures of the capitals of the various nations are indicated by the vertical scale, and the period at which each was eminent is shown by the horizontal scale. A thickening of a city's line indicates special preëminence. The curve of the graph indicates the average temperature of the leading capitals; most weight was given to the city preëminent, but the curve was smoothed somewhat in the effort to make clear what would appear to be the general course of leadership in civilization, freed from minor fluctuations. Four southward movements may be noted, all of which coincide with declines of civilization. Thus on the break-up of the Roman Empire civilization centered in Carthage and Alexandria as well as Constantinople, and presently in Damascus and Bagdad; then gradually it moved northward through the Middle Ages, passing the Roman high level about 1350 and attaining regions colder than ever before. So with the scene of highest civilization moving coldward when civilization advances and southward when it disintegrates, the logical inference is that each grade of civilization has an appropriate temperature in which it will especially flourish. This theory, if established, largely explains the changes of headship between nations in the past and may be used as a basis of prediction, if we assume that civilization will advance further. Let us therefore ascertain what basis the theory has in reason, aside from its observed correspondence with the course of empire in the past.

It has often been observed that civilization proper always be-

gins in warm regions. Its independent original sites seem to be Upper Egypt and the lower Mesopotamian valley, India, the Shen-si province and Guatemala. All are warm, all but one hot. The explanation for civilization's first appearance in such places is that in a hot climate agriculture can be most productive, while an abundant food supply provides vigor, security, a dense population and surplus hands for occupations other than food production—factors necessary for the start of civilization. There are indeed other characteristics of most or all of these regions, such as dryness, need of irrigation or drainage, and water transport, but these need not concern us here; they are found in many cool lands too. The point is that warmth was necessary for a nascent civilization, and, further, that the importance of warmth steadily diminished thereafter, as man's power to produce food was multiplied by better animals and instruments for agriculture, greater science, more diligent habits, the decreasing importance of food as compared with miscellaneous other factors, such as minerals, and latterly by the power of importing food from other lands, as notably in the case of England, Germany and frigid Finland. In short, the positive value of warmth, for agriculture, steadily diminishes with the advance of civilization, while its harmful effects upon health and mind cause the scene of maximum efficiency in civilization, decreasingly bound by agriculture, to withdraw ever farther from the tropics.

A second factor in northward progress, mentioned only by Spencer and a few other writers but very important, is the *possibility* of living in a cool or cold climate. Advancing civilization has given us warmer clothes, tighter houses, fitted with artificial lighting and glass windows, chimneys, stoves and furnaces (the last four introduced, respectively, in the first century B. C. and the fourteenth, eighteenth and nineteenth A. D.), and a good fuel supply (wood can never be cheap in a region of dense population, unless transportation is highly developed, nor ever comparable to modern coal). And while civilization has been making agriculture less important, it has leaned increasingly upon the handicrafts, manufactures and clerical and other brain occupations, all of which can be pursued

Another changing need of civilization is an increasing demand for responsibility and stability. Hot weather, by increasing the body's chemical action and hence its surplus energy, along with a bad emotional state, has been shown to increase obstreperousness, crime, suicide, assaults, insanity and revolutions.¹ Probably such actions are more disruptive to a complicated, advanced civilization than to a primitive one. It has long been remarked that the fiery and volatile temperament of the southern peoples renders them incapable of the responsibilities and toils by which phlegmatic northern races have made great their states. But might not the southern temperament have been good enough for the simple and petty life, the agriculture and handicrafts, of a more primitive culture?

The first positive value of cool climes is their greater variation of temperature from day to day and season to season, very valuable stimuli which are found more in the latitudes of slanting sun. Professor Ellsworth Huntington² has shown that variations from day to day bring an important increase in human energy. Greater variations from month to month, together with intermittency of rainfall, entail greater variation in occupation, and varied tasks are probably more easy and beneficial in a complicated, mental civilization than in a primitive one. Next and even more important is the greater comfort, and vigor, physical and especially mental, which are possible in a cool climate (since man has gradually learned to protect himself against the cold days of winter but hardly against the hot ones of summer). Professor Huntington shows, through records of deaths and of the daily work of thousands of factory operatives from Connecticut to Havana, that *physical* efficiency is at its best on days when the temperature averages 64° F. for night and day, *i. e.*, about the mean annual temperature of San Diego, Gibraltar, Palermo and Jerusalem. But *mental* efficiency, as measured by daily marks at West Point and Annapolis, is best on much colder days, about 40°, which give light

¹ Ed. G. Dexter, *Weather Influences*.

² *Civilization and Climate*.

frosts at night. This is probably the result of the stimulus coming from the changes of temperature then experienced in going in and out of doors. Forty degrees is about the annual mean of Quebec, Christiania, Moscow and Helsingfors. The difference between the ideal latitudes for physical and for mental labor is thus as broad as the range of latitude which culture's headship has traversed.

Primitive civilization has been said to depend chiefly upon the heaping up of material wealth, created almost entirely by manual labor, performed by practically all the population, chiefly tillers of the soil, including often the women. There were some few thinkers—a handful of priests to design the Pyramids and a few artists, nobles, judges and overseers, but the dull, toiling *fellahin*, on whose efficiency nearly everything depended, comprised almost all the population. But a modern civilization, like that of our Empire State, requires mental rather than physical labor from a very large proportion of the population, while even the so-called handicrafts, such as house-keeping, farming and auto-driving, demand a more active mentality than the tillage or even handicrafts of primitive civilization. And the priest-scientist, the judge and the foreman have become leaders, wielding powers greater than ever before for the progress or ruin of the community, to which their ideas are all-important. Altogether, modern civilization would seem to depend more upon clear thinking, initiative, will and self-control (in useful directions), and primitive civilization more upon physical toil, bodily energy. The change has been gradual, depending on the progress of civilization.

Let us consider, for example, a climate which Huntington has found to be about the best in the world for a modern civilization, that is, that stimulating climate which enabled Germany to fight half the world, making bread from wood, clothes from thistles, tin of lacker, rubber from goodness knows what and patriotism out of aggressive national ambition. About the year 90 A.D. Tacitus was describing this country, which he found gloomy and cold in comparison with sunny Rome, and with a *kultur* vastly inferior. He wrote that our ancestors there were "powerful in sudden exertions, but impatient of

toil and labor. . . . Nor are they easily persuaded to cultivate the earth. . . . Nay, they even think it base and spiritless to earn by sweat what they might purchase with blood. During the intervals of war they pass their time less in hunting than in a sluggish repose, divided between sleep and the table. All the bravest of the warriors, committing the care of the house, the family affairs and the lands to the women, old men and weaker part of the domestics, stupefy themselves by inaction; so wonderful is the contrast presented by nature, that the same persons love indolence, and hate tranquillity!" We learn from other passages that the Germans' favorite occupations, after war and hunting, were gambling and drinking. And we find precisely the same conditions among the northern Amerinds, in a similar climate.

What we have here seems to be mental vigor, combined with physical indolence (in spite of physical power). It seems utterly unsuitable for developing an early civilization, which could certainly never have been founded on abhorrence of agriculture and toil, and love of war, hunting, gambling and drinking.

But though a people may not like to toil, they can be forced to do so by an invading or indigenous noble class, armed with ideas from an adjacent superior culture. So during the Middle Ages the northern peoples learned to labor willy-nilly, the individuals who failed to develop the habit being starved or hanged, although in a barbarian state they could have lived as long as the next man. Thus the northern nations conquered their physical indolence and retain their mental vigor (from a cool and varying climate), their alertness, which the peoples inhabiting hot countries never had. And so, with a civilization depending increasingly on mental effort, the northern nations have gone ahead.¹

¹ S. E. Slocum holds that the nervous system "as it becomes more complex" needs a more bracing, varied climate. (*Pop. Sci. Mo.*, 1910, p. 158). An engineer, P. Mougeolle, has described the northward movement of civilization in *Statique des civilisations*, 1883, a book of more leaves than fruit. His only explanation is acquired diligence, as above. Huntington has pointed out that the highly variable northern climates oblige the farmer to be alert and foresighted and highly laborious in critical days, in contrast with the more routine plodder of the sub-tropical irrigated areas (*The Earth and its Inhabitants*, ed. by Lull, 1918, p. 179).

Let us again turn to the diagram of the path of supremacy. Its main curve has been drawn with the purpose of finding at what isotherm the highest civilization in each country should have been had there been no disturbances from other factors than mean annual temperature. The curve has therefore been smoothed somewhat, by combining adjacent centuries and by considering the cities where civilization was high, if not the highest in the world. And indeed it is a very difficult matter to know just where civilization was at its height in each decade. Dates and temperatures are also somewhat uncertain.¹ The capital of each region has been chosen to represent the whole; capitals are generally situated centrally, and great cities are usually the homes and creators of civilization. After all the errors in the diagram have been mentioned and I hope disregarded as fairly well canceling each other, it remains evident that the path of civilization's banner has led steadily northward while culture was advancing and *vice versa*. Most significant of all is the sharp southward movement through 8° of temperature, about 300 A.D., just when civilization was declining. This period warrants a brief discussion, especially since our school books lay little stress on it.

Roman civilization at its height appears to have had its center even north of Rome. The Po valley was the richest region of all the empire; ² Milan superseded Rome as the capital in 296; Aquileja was the second city of Italy under Hadrian and was called by Ausonius the ninth greatest in the empire; yet in 452 it was destroyed and abandoned. Ravenna, Salona, Ancona, Arles, Lyons, Trier and other cities of Gaul were highly civilized in the later empire. Yet at the same time Carthage was regaining her old splendor, and by 250 had half a million inhabitants. (See diagram of City Populations and Temperatures below.) During the failing days of the empire Carthage became a special center of the Christian religion, with its bishops rivaling those of Rome: Tertullian, Cyprian and

¹ The temperature of most former capitals is available in J. Hann's *Handbuch der Klimatologie*, 2d ed., 1897.

² L. Friedländer says that in Strabo's time Cisalpine Gaul "surpassed all other countries in the wealth and greatness of her cities."

Augustine were all of this region. Carthage survived the Vandal rule and flourished until its destruction by the Arabs. Alexandria in the same epoch was equally large and a center of high civilization, though of disorder. Antioch too waxed great, wealthy and wicked. Followed the days when Damascus, Bagdad and Cordova surpassed all the cities of Christendom in civilization, as represented by splendor, art, wealth, learning, harmony, progress and population. Then began the rapid upward and coldward climb of civilization to the present day.

Three other warmward movements are evident earlier. The first exactly coincided with the undoubted slump in culture after the great Pyramid Age at Memphis. The second southward movement began with the similar decadence after Egypt's Middle Kingdom and the first palace at Cnossus. It continued, we must confess, in spite of the rise of Egyptian civilization of the Third Empire, if we consider only the capital at Thebes. The center remained south during the period of widespread barbarism which ensued around 1000 B. C. but rose with the ascendancy of the Syrian states. The third southward turn occurred after the Golden Age of Greece, when Rhodes, Alexandria, the Greek cities of Asia and Sicily, and Carthage became the great centers of culture.

These retrograde movements from culture and northing give us an additional means of testing our theory by the facts. If the rule were never interfered with by other forces, all points in our graph's curve which lie at the same horizontal level (equal temperatures) should be at years whose highest civilization was equal. Thus the coldest temperature in which Roman civilization centered, 58°F., was reattained at approximately 1350 A.D., just about the year that the *cultural* level of grandest Rome was reattained. By laying a ruler on the graph the reader can verify the closeness in general of these correspondences. In spite of the entrance of many other factors in such close measurements, this comparison upholds our thesis.

One good measure of civilization, *sculpture*, has been competently studied by Flinders Petrie in his very suggestive *Revolutions of Civilization*. We have reproduced at the top of the path of supremacy chart his curve of the ups

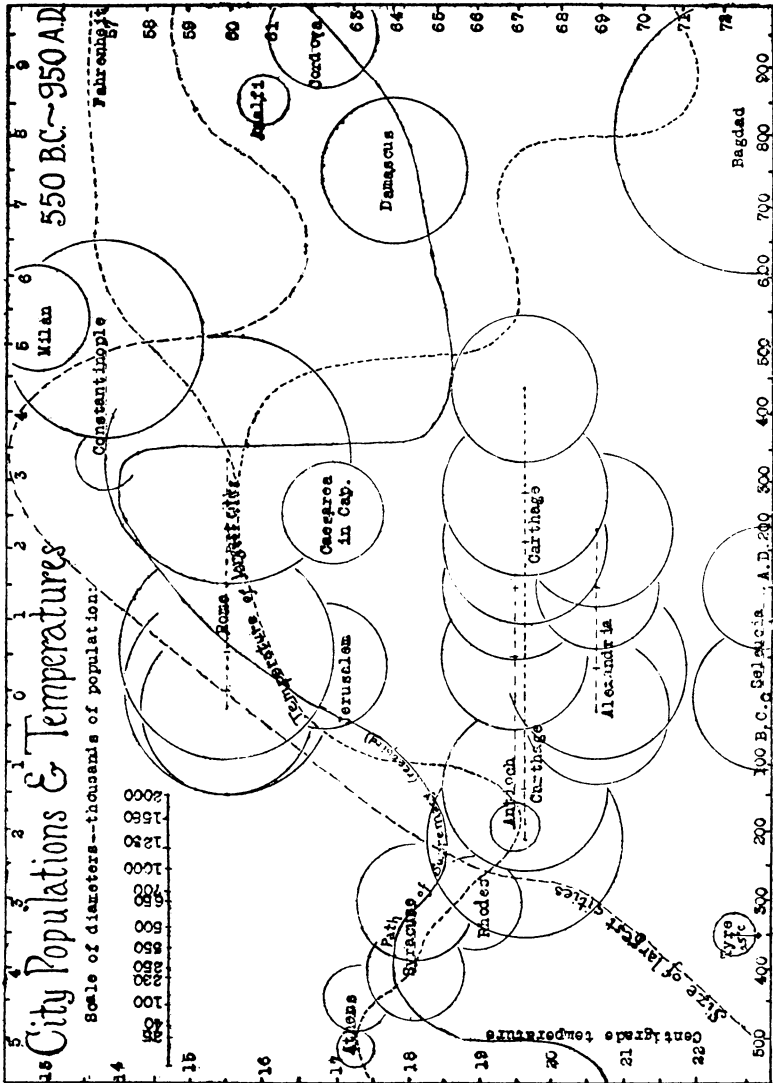
and downs of sculpture, with the chronology adjusted to Breasted's, which we have followed below. As the high point of each period Dr. Petrie has taken the transition point between competently handled archaism and full mastery of the new style. The high points in the other arts and in mechanics, science and wealth, he claims, occur later than in sculpture, increasing to several centuries later by the newest cycle, so that his curve of civilization as a whole would have an increasing lag after that of sculpture. Although this sculpture curve has a wholly different basis from the curve of the path of supremacy, there is a general synchronism between the two.

It is not easy to find an objective scale wherewith to measure degrees of ancient civilization. The criteria must be uniform throughout, for, as Petrie says, it is difficult to contrast Egyptian construction, Greek poetry and medieval self-denial. The author has chosen, as did Mougeolle, the *size of cities*, as being perhaps the best single criterion of culture and one available in arithmetic form; yet ancient data are scanty and uncertain, for while a city's population is the first fact that a modern mentions, it was the last to concern an ancient writer. But we have taken what we could find, from Beloch, Friedländer¹ and many other sources, and present the result, for the years most critical for our theory, in the accompanying chart. Populations are indicated by the area of the circles, and temperatures and dates by the vertical and horizontal placing of their centers. In the curved lines we have endeavored to summarize the movements in city size and the warmth location of the largest cities, and have recopied our curve of the path of supremacy. It will be seen that the three curves correspond as closely as could be expected from the fragmentary and uncertain data regarding only one criterion of civilization. These figures are especially useful to assist our evaluation of various civilizations, as Athens compared with Rome, or as showing the great importance of Carthage, Damascus and Bagdad.

Not only the direction of culture's development (whether upward or downward) but also its speed is reflected in the

¹ Friedländer's have been reduced by $\frac{1}{3}$. Populations stated to be "at least" or "more than" have in all cases been increased by $\frac{1}{4}$.

movements across heat latitudes. Especially striking are the parallelisms between the rates of northing and the unprogressive, weary vicissitudes of the first 2400 years, when civiliza-



tion would rise from near barbarism only to fall back thither repeatedly, then, after 1000 B. C. and the introduction of iron, the almost sustained rise to the grandeur and fall of Rome,

then the slow recovery in the Dark Ages and the faster progress in medieval and modern times.

It is very significant that also *within* each nation civilization has moved coldward in progressing. In practically every country culture has appeared first along the warm edge and has progressed coldward as it developed. Greek civilization began in Crete and ended in Constantinople. The leadership of Italy passed from Sicily through Rome to Milan, and that of Spain from Cadiz to Madrid and Barcelona. German culture began along the Rhine and spread gradually east-northeast, perpendicularly across the isotherms. The nations which are exceptions prove the rule. These are the countries north of the isotherm of 50° F., 10° C., which traces the ridge of contemporary civilization. This very significant line runs from Astoria, Oregon, past Puget Sound, thence to Omaha, Des Moines, Indianapolis, south of Cleveland and Buffalo, a little north of New York, to Dublin, past Liverpool and London, to Rotterdam and Paris, too, along the Rhine valley to Munich, south of Vienna, across Hungary and Rumania to Odessa and Astrakhan, through regions whose increasing monotony of climate makes them no longer available for high civilization, to cross favorable Japan midway between Tokyo and Hakodate.¹ Within each country south of this "ridge" isotherm and north of 70° F., the banner of civilization has passed from south to north, while in each country north of the ridge, civilization has always been highest along the warm edge of that country. The obvious explanation of this unchangedness in the cold countries is that the highest culture yet attained, that found along the most favorable sections of the 50° isotherm, is suited only to the warmest edge of these countries, if to that; but when civilization has advanced further and its ideal or "ridge" isotherm has become a colder one, the northern countries will experience the same internal transfer of regional supremacy that the southern nations have. This always hap-

¹ In the southern hemisphere this isotherm crosses only the southern tips of South America (47° S. Lat.) and New Zealand. Practically the whole hemisphere is climatically hopeless for leadership in civilization, so we have ignored it herein, although it offers much to support and nothing to contradict.

pened in the past, when a country lay to the north of the ridge isotherm of that epoch.

The importance of a mean annual temperature appropriate to the extant level of culture is strikingly illustrated by the manner in which civilization today closely clusters about the isotherm of 10° C. In different longitudes along this line the culture is of very different grade, because many other factors than temperature exert their influence, such as lack of storms in mountain-shielded regions. But all the highest civilization that the world possesses is grouped about this isotherm, as will be evident from the data given below of the world's cities having populations of over two millions. Here again we have taken size of cities as a good criterion of civilization, but have added certain valuable appraisals of the rank in moral civilization of the regions (such as northern France) in which each city is situated. Drawn from Huntington's *Civilization and Climate*, these were made by geographers and other specially competent people residing all over the world, and rank the regions according to their energy, morality, intelligence and all such moral qualities. The population statistics are the latest obtainable.¹

¹American city populations are derived from the 1920 census, increased to a "metropolitan district" figure in the proportion of the 1910 city and metropolitan district figures. Foreign city statistics likewise include one or more suburbs, save in the case of Petrograd, Tokyo, Vienna, Buenos Ayres, Ozaka, Moscow, Peking and Shanghai.

Cities	Temperature		Difference from 50° F.	Year	Population	Regional vigor
	C.	F.				
New York . .	10.6	51.1	1.1	1920	7,635,000	100
London . . .	10.3	50.5	.5	1911	7,521,685	100
Paris	9.9	49.8	.2	1911	4,115,000	99
Berlin	9.1	48.2	1.8	1910	3,974,300	99
Chicago . . .	8.8	47.8	2.2	1920	3,025,000	95
Petrograd . .	3.7	38.7	11.3	1915	2,318,645	82
Tokyo. . . .	13.7	56.7	6.7	1916	2,244,796	83
Vienna	9.7	49.4	.6	1914	2,149,800	94
Average . . .	9.47	49.0	3.05	1916	4,116,778	94

It will be noted that the average difference from 50° F. is only 3.05° , and if we consider only the five largest cities, which are the acknowledged leaders of civilization, the average departure is only 1.2° , and the temperature 49.5° .

The cities of between one and two millions are, in order: Philadelphia, Boston, Buenos Ayres, Ozaka, Hankau, Constantinople, Calcutta, Moscow, Detroit, Pittsburg, Rio, Peking and Shanghai, and their average temperature 57.1° . Taking all cities together, the correlation between temperature and regional vigor is .92¹.

We may now consider it established that civilization has tended to move coldward while advancing and warmward when declining. To account for the fact various theories have been proposed beside the one defended herein. It is said, for example, that it was the irruption of northern barbarians, in the last days of the Roman Empire, which drove civilization southward at the same time that it was declining. It may be doubted whether the German barbarians necessarily hampered civilization greatly. They quickly adopted Rome's religion and much of her culture; Carthage thrived under their rule; and they were of the same race as the Normans, who, sailing to warmer climes in Normandy, Ireland and Sicily, speedily assimilated the foreign cultures. The fact of invasion alone affords no good reason for the southward movement of civilization from Milan to Carthage. But culture *was* declining, and we observe that its leadership went southward. As to *why* it deteriorated, for once no explanation is offered, but a doubt is ventured that invasions drove it out of the north.

But even if the argument from barbarian irruptions were valid (and it is true that in most periods of decadence there have occurred invasions by barbarians from colder countries, damaging the northern part of the cultural area more than the southern), still this would not account for the *northward* movements of civilization nor adequately for the southward ones, and would explain only 5 or 10 of the 53 centuries in

¹ All the variations above or below 10° C. and 100 rank were treated as positive, and Pearson's formula was applied.

view. So is it with many other explanations, such as that the great nations of today are those possessing coal and iron, or that a primitive civilization is assisted by rivers and a higher one by sea-ports, or that nations on peninsulas or large islands will prosper. Each of these theories helps to explain the prominence of individual nations, of Greece, for example, as preceding Bohemia, or of England in the 19th century, but they do not explain the *whole movement*, the close correlation through 5300 years between culture and cold. A miscellaneous collection of theories, chosen like blocks of wood from a scrap-heap by hit-and-miss hunting, a different form to fit each need, a different explanation to suit each section of a unified movement, will prove anything or rather nothing. Only a single, consistent theory can satisfactorily explain a correlation observed to be very close and enduring.

There are but four other and consistent theories known to the writer, and none fits the facts. One is that the isotherms have been moving northward, Europe growing warmer. But the evidence of plant life shows that the warmth of Europe has increased but a degree of two, if at all, in the last 2000 years. Another theory is that civilization has spread by imitation, the torch of culture being passed to neighbor nations. This is almost wholly true; yet the beacon light of cultural supremacy has been lighted now east, now west, passing in most erratic manner over thousands of miles in the same heat latitude, from Constantinople to China, perhaps, from Bagdad to Spain, generally westward, yet most irregularly, and never moving far *across* the isotherms, unless in accordance with our statement of the correlation of culture and cold. Bonacina suggests that perhaps nations, like individuals, mature more slowly in cold climates; but he gives no explanation for this strange idea, and this theory ignores the warmward retrogressions.

The last theory is advanced by Professor Huntington, in *Civilization and Climate*. He has proved that there was more rain in earlier millenniums in such countries as Palestine and southern Italy, and presumably more cyclonic storms with their mental stimulus from daily variations of temperature. With the arid and monotonous desert belt of Saharan climate gradu-

ally moving northward, civilization would naturally be pushed toward the pole, and it always tends, Huntington claims, to be highest on the belt of maximum storminess. But the theory has too many weak parts, particularly in its connection with historic civilization. The variations in rainfall required, for example, by the rings of growth of the California Big Trees, do not correspond to the ups and downs of civilization. In particular, the greatest southward movement occurred at just the wrong time to agree with the trees. The fall of Rome came in the latter years of an 800-year period of increasing drought, which doubtless had something to do with the catastrophe. But if changing storminess were the cause of geographic movements of civilization, the abode of culture should have gone north, to Gaul or Germany or perhaps to the Black Sea colonies. Instead, it went southward to the edge of the desert, to Carthage, Alexandria and Bagdad.

It should be said that Professor Huntington's theory refers rather to vigor of civilization, independent progressiveness, than to the wealth, learning, empire and other elements of mainly material culture with which we are dealing here. Clovis and Charlemagne were more vigorous than Harûn-al-Rashid, very likely because from the movement of the storm belt they enjoyed a more varied climate. But they were not so civilized.

In the New World, too, the distribution of vigor, present and past, may be according to variability of climate; but the location of culture rather supports our own theory. When America was explored in the 16th century, its climates being approximately the same as today, its highest culture was in the plateaus of Mexico and Peru, which are indeed cool, but this civilization had originated in the baking lowlands of Guatemala, and made its closest approach to civilization proper in Yucatan, on the heat equator. Tribes next in cultural rank were those of our southwest plains, and then those of our southern states and other warm regions and the temperate north-west coast, while our northern states east of the Rockies, with a climate almost ideal, as Huntington finds, for (a modern) civilization, supported only the hardy but savage Algonkins and a group of Iroquois little higher in the arts of life. The New World is another

demonstration that the same kind of climate is not ideal for all grades of civilization.

To combine Huntington's theory with that of this paper, it may be said that location near a main storm path, with the resultant daily variations of temperature, tends to give a population energy, achievement and empire. This belt of storms has probably moved northward during history. But while the banner of civilization tends to follow these varied skies that make creative lands, it tends more strongly to match its degree of culture with an appropriate degree of temperature, as is made very evident by the four occasions when declines of civilization have been matched by southward trends, and by the lack of correlation between past rainfall and trans-isothermic movements of the banner of civilization, and between the distributions of storms and culture in the Americas of 1500. Storminess affects vigor and progressiveness and the location of leadership, especially as to longitude; but it is mainly temperature that governs the latitude in which it will be found.

To restate our own theory, an essential consideration determining the scene of world leadership in civilization, although by no means the only consideration, is mean annual temperature. This almost invariably falls as the degree of civilization rises and rises when that falls. Many other factors, such as storminess, trade routes, invasions, natural resources, concurrently affect the fate of nations, but mean annual temperature keeps all the variations within 9° F., usually 3°, of the mean most appropriate for that particular degree of civilization, when this is the leader of the world. The reasons for this connection between civilization and temperature are: (1) the greater the heat, the easier it is on the whole to get a living by agriculture, but the higher the civilization, the less it depends upon agriculture; (2) advance of civilization brings increasing power to dwell in a cold climate and to do efficient and important work within doors; (3) an increasingly complex civilization demands more responsibility and stability, characteristics of cool climates; (4) physical efficiency is best promoted by a warmish temperature (64°) and mental by a cool climate (40°), and civilization in its evolution depends increasingly upon

the mind. A northern climate, with more of stimulating variety from day to day and season to season and with its prevailing coolness and freedom from hot, stupefying summers, makes possible more *thinking* and self-control and a higher civilization builded thereupon than was ever possible in Egypt or in Rome.

If the final purpose of science is control, the next to final purpose is prediction. If we have established for the past the thesis that civilization moves coldward while progressing, we can apply it to the future. For most of us still believe, as we did so confidently before 1914, that civilization will continue to progress, for some centuries at least. We have described the present ridge isotherm, of 50° F., which bisects the greatest urban regions of the world and marks the present or but recently passed, locus of the very highest civilization. When in the coming century civilization shall have progressed to a still higher type, then shall empire, cultural leadership at least, pass on to the colder climes, as it has done so many times before. Detroit, Montreal, Halifax, Stockholm, Riga, Petrograd, have mean annual temperatures of between 47° and 38° . The belt of ideal temperature has in the past swept across France and now blesses only its departments wrecked by the cool destroyers. The diamond belt of empire lies and has lain for a generation fair over the industrial regions of Germany.

Scandinavia has in recent decades shown great cultural activity, as if preparing to lead the world next. Russia is rousing herself from a sleep of ages. In 1914 the most virile architecture was that of the apartment houses of Berlin. In 2000 it will perhaps be found in Detroit and Copenhagen, in 2100 in Montreal, Christiania and Memel.

Farther we need not go. There is no necessity for civilization to be driven into Artic snows; the law of coldward progress could be restated in such terms as would hold true for the past yet not require northward journeying indefinitely in the future. But that will require strange new houses and industries that cannot be discussed here. I see no reason to think that this 5000-year-old process will be altered within the 20th century.

There are some who believe, and many who fear that civilization, instead of progressing, may now be approaching a sixth decline. Their fears may be increased by the drooping curve which the graph shows from 1500 to 1920, a slowing-up of the coldward movement when one would have expected an acceleration. But other explanations are possible than that this is the beginning of a decline. 1. The previous declines have not had preliminary retardations. 2. The droop may be a mere accident, from other forces. If Chicago or Berlin should presently take the unquestioned lead, the droop would be more than straightened out. 3. Civilization may be approaching its northern limit, as suggested with doubt above, although not its cultural limit. 4. The droop may be due to a too rapid northing in the 16th century, when the focus of civilization, for reasons not connected with temperature, shifted in its northward progress from the northern Mediterranean to the English Channel, and therefore arrived too soon in the north. The natural mid-way points would have been on the west coast of France; and La Rochelle did at one time, under the Huguenots, show great activity and commercial prominence. But the French west coast lacked water transportation routes binding it to a great surrounding region, nor had it the best seamen nor so varied a climate (especially north of La Rochelle) as the Channel lands; the belt of empire swept over it, hardly halting.

So with these four explanations of harmless augury we need not fear the drooping of the curve. On toward the Pole Star the ship of destiny sails yet.

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